ORDER

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

6090.1B

3/20/00

SUBJ: NATIONAL AIRSPACE SYSTEM MANAGED SUBSYSTEMS DEVELOPMENT AND IMPLEMENTATION

1. PURPOSE. This order defines the responsibilities of the National Airspace System (NAS) Managed Subsystem (NMS) implementation offices assigned engineering responsibility for Facilities & Equipment (F&E) projects, and the responsibilities of the NAS Infrastructure Management System (NIMS) as related to the development and implementation of NMS-to-NIMS communications interfaces.

2. DISTRIBUTION. This order is distributed to the division level in the Offices of Acquisition, Air Traffic Systems Development, Aviation Research, Communications, Navigation, and Surveillance, and Systems Architecture and Investment Analysis, and the Air Traffic and Airway Facilities Services in the Washington headquarters and to the William J. Hughes Technical Center.

3. CANCELLATION. Order 6090.1A, Development and Implementation of Remote Monitoring Subsystems (RMS) within the National Airspace System (NAS), dated May 8, 1995, is canceled.

4. BACKGROUND. During 1995, Mission Need Statement (MNS) 145 (originally titled Sustain Remote Maintenance Monitoring System (RMMS)) was revised and expanded to incorporate the new mission needs found in the Airways Facilities (AF) Concept of Operations for the Future. Later that same year, the mission needs found in MNS-247, Integrated Network Management System (INMS), were also incorporated into MNS-145. To support the national implementation of NIMS interfaces, Order 6000.30B, Policy for Maintenance of the NAS Through the Year 2000, specified that all future NAS subsystems shall be candidates for a NIMS capability. Existing NAS subsystems will be retrofitted for NIMS capability to the degree based on a system cost-benefit analysis. The NIMS PT has the responsibility for ensuring proper implementation of the NIMS capabilities within the NAS.

5. EXPLANATION OF CHANGES. This revision:

a. Defines NMS-to-NIMS communication interface development and implementation procedures and requirements for NAS Managed Subsystems in the NIMS environment.

b. Redefines, consolidates, and allocates traditional responsibilities of the NMS implementation PT and the NIMS PT responsibilities as required to integrate the NMS into the NIMS and the NIMS into the NAS.

c. Provides a specific list of project cost elements and funding responsibilities of the NMS implementation product teams for NIMS/NMS interface development.

d. Provides a listing of the current standards and guidelines that apply to the NMS as well as establishes the vehicle for the exchange of information between the respective NMS implementation PTs and the NIMS PT.

7. RESPONSIBILITIES OF PARTICIPATING ORGANIZATIONS. The NMS implementation PT assigned engineering responsibility for a particular facility or equipment is also responsible for the design and development of the associated NMS embedded proxy function in or retrofitted to the facility or equipment. The NMS implementation PT is responsible for ensuring the appropriate NMS requirements are included in the F&E project requirements and design. The NIMS PT is responsible for the NMS integration into the NIMS and the NIMS integration into the NAS. The NIMS Test and Evaluation Team Lead is responsible for coordination of testing. This order will apply to F&E projects requiring an NMS as mandated by Order 6000.30B (latest version). This order allocates responsibilities to either the NMS PT responsible for F&E projects required to have a NIMS interface, or to the NIMS PT as follows:

a. NMS Implementation PT Responsibilities. The NMS PT shall provide resources and support to the NIMS PT to ensure that the following actions are taken to successfully develop and implement a suitable interface for interconnectivity with the NIMS. To accomplish this the NMS PT shall:

(1) Negotiate a Letter of Agreement (LOA) with the NIMS PT. Appendix 1, Sample Letter of Agreement, contains the recommended form and content of the document. This LOA shall indicate the NIMS/NMS-related activities to be accomplished, the organization responsible for performing or coordinating each activity, the anticipated schedule for completion, and the estimated NIMS/NMS-related F&E project funding requirements, including the sources of the funding. The LOA shall be completed as early in the F&E project life cycle as possible, preferably prior to the development of the equipment specification and Statement of Work (SOW). This LOA shall be coordinated with the NIMS PT to determine the appropriate content, and it shall serve as a common agreement of the NMS implementation PT and NIMS PT responsibilities. Both the NMS implementation PT and the NIMS PT must concur with the LOA.

(2) Ensure that all NIMS requirements, as defined in the NAS technical baseline and other documentation (refer to paragraph 8), are included as part of the F&E project design effort. The NIMS requirements for the total facility should also include environmental, security, and fire safety requirements. The NMS implementation PT shall coordinate with the NIMS PT to determine the NIMS/NMS operational requirements applicable to their F&E project.

(3) Provide the NIMS PT with a detailed cost breakdown for NIMS/NMS-related work on the F&E project. Coordinate with the NIMS PT on any subsequent changes and the reasons for those changes.

(4) Ensure that the F&E project specification includes the NIMS/NMS requirements in accordance with the appropriate requirements documents specified in paragraph 8. Also, ensure that the Verification Requirements Traceability Matrix (VRTM) is in accordance with the latest edition of FAA Standard FAA-STD-005, Preparation of Specification Documents. These NMS implementation PT documents related to NIMS implementation shall be coordinated with the NIMS PT prior to baselining.

(5) Include requirements for the NIMS/NMS interface in the project SOW. This document shall be coordinated with the NIMS PT prior to baselining. Modifications to the contract affecting the NIMS shall be coordinated with the NIMS PT.

(6) Include the NIMS/NMS interface in the T&E section of the project Integrated Program Plan (IPP). The NMS implementation PT shall be responsible for verifying that the NMS, built in accordance with the approved ICD, will properly interface with the NIMS when the NIMS Test and Evaluation Evaluation Team performs the System Test. Because the NIMS/NMS integration involves NIMS software, it is necessary to coordinate all pertinent ICDs and related interface documentation with the NIMS Test and Evaluation Team.

6. NIMS-TO-NMS INTERFACE DESCRIPTION. The NMSs are an integral part of a facility or equipment that monitors and reports status, provides the capability to execute remote control commands, and serves as a local maintenance access point. The NMS encompasses subsystem manager to NIMS manager interfaces, embedded manager to NIMS manager interfaces, proxy agent/gateway manager to NIMS manager interfaces, and Remote Monitored Subsystem (RMS) interfaces.

Figure 1, NAS Managed Subsystems to NIMS Interface, shows the relationship between the NIMS Manager and the NMS. The agent may be an NMS-embedded agent or proxy agent resident in an external proxy agent/gateway platform.

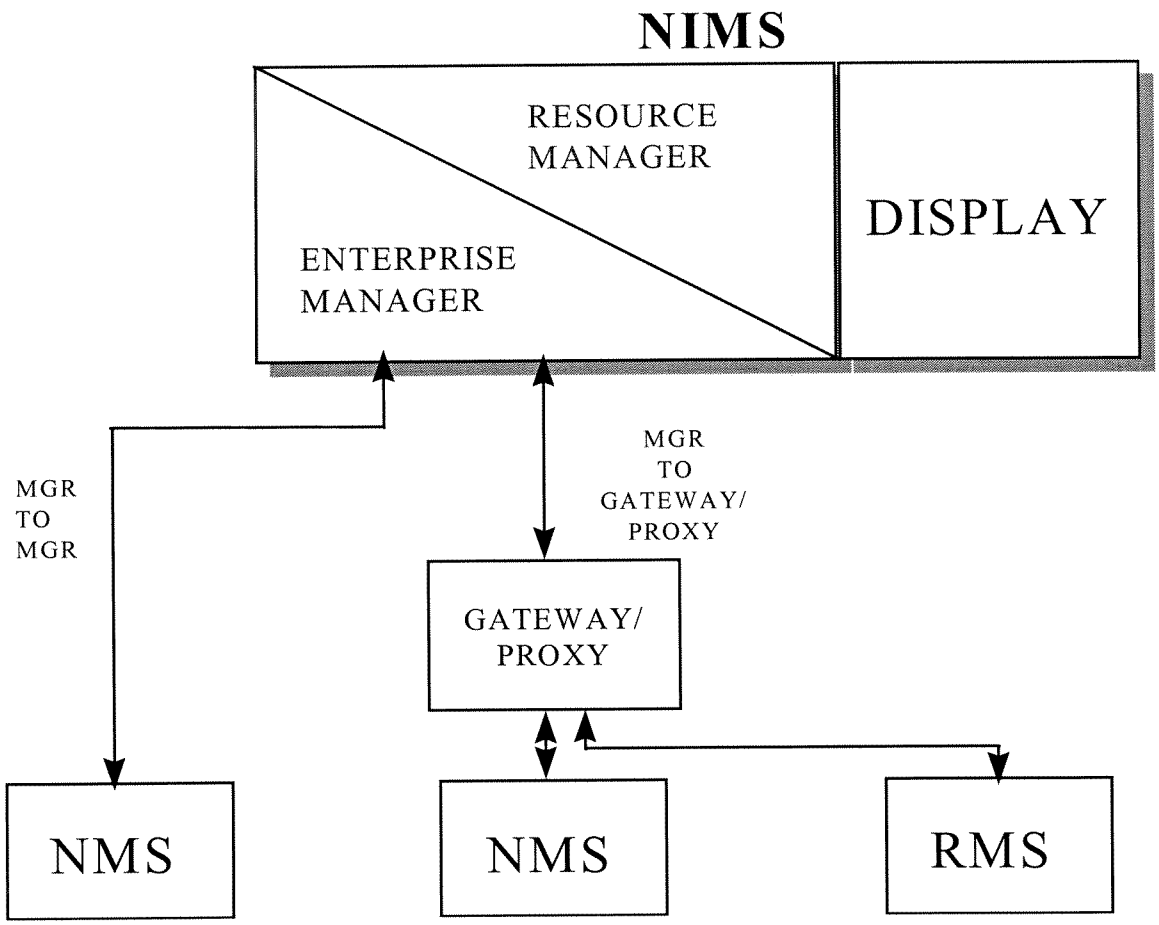

Figure 1. NAS Managed Subsystems to NIMS Interface

a. The connectivity between the NIMS Manager and the NMS shall enable NIMS to monitor and control NAS subsystems.

b. Gateways/proxy agents shall be used to allow NAS subsystems, using proprietary and NON-standard management functions (e.g., NAS-MD-790), to communicate with the NIMS Manager.

(7) Ensure that the contractor test plans and procedures include the NIMS/NMS requirements as stated in the contract and are in accordance with the latest edition of the AMS T&E Process Guidelines. These plans and procedures shall be coordinated with the NIMS PT prior to use.

(8) Ensure that the contractor's ICD, as required by the contract, includes the NIMS/NMS requirements to the LRU level. The NMS implementation PT shall ensure that the ICD is developed in accordance with the latest edition of FAA-STD-025, Preparation of Interface Documentation. The draft ICD shall be ready at Preliminary Design Review (PDR) per MIL-STD-973. Technical Reviews and Audits for Systems, Equipment and Computer Software, are to be finalized prior to completion of Critical Design Review (CDR). All interfaces not designed to NAS-IR-5107000 shall be developed in accordance with the appropriate NAS IRD. The NMS implementation PT shall ensure that the NIMS PT is provided a minimum of 30 days to review all iterations of NIMS/NMS-related ICDs. The NMS implementation PT shall ensure that all NIMS/NMS-related comments are resolved before the document is baselined by the FAA CCB. All changes to the ICD affecting the NIMS shall be coordinated with the NIMS PT prior to approval. The contractor's baselined ICD, under NAS configuration control, shall be available at least one year prior to the first Operational Readiness Demonstration (ORD). Any changes to the ICD after baselining shall be submitted via the implementation IPT's NAS Change Proposal (NCP) process for CCB approval. The schedule requirements for the ICD shall be included in the LOA.

(9) Ensure availability of the NMS for a period of 1 month for the purpose of NIMS developmental testing (DT), under the direction of the NIMS Test and Evaluation Test Team. The purpose of developmental testing is to verify that the NIMS software adaptation corresponds to the managed subsystem ICD. This test shall commence a minimum of 6 months prior to the F&E projects first ORD. Additionally, upon delivery of the baselined ICD, or a minimum of 6 months prior to the expected date of developmental testing commencement, the NMS implementation PT will inform the NIMS PT and the Telecommunications Network Planning and Engineering Division (AOP-400), of the location and schedule of NMS availability for developmental testing. The NMS implementation PT shall also coordinate with AOP-400 and appropriate regional personnel with regard to providing connectivity from the NMS to NIMS to support testing. This coordination effort shall include the appropriate regional office and affected NIMS facility, including the William J. Hughes Technical Center (WJHTC). If the WJHTC is the negotiated site for confidence testing, additional testing may be required at a field site.

(10) Include NIMS/NMS requirements in the Project Implementation Plan (PIP), in accordance with the latest edition of FAA-STD-036, Preparation of Project Implementation Plans. Also include the NIMS/NMS in the implementation section of the project IPP. Changes affecting the NIMS shall be coordinated with the NIMS PT

(11) Provide for the NIMS PT participation in all NIMS-related NMS project technical reviews, including Preliminary Design Reviews (PDR), Critical Design Reviews (CDR), Technical Interchange Meetings (TIM), or equivalent. Coordinate all proposed NIMS/NMS-related meeting schedules with the NIMS PT before they are finalized.

(12) Submit to the NIMS PT and AOP-400, the F&E project installation schedules and NMS-to-NIMS connectivity information for all planned installations. This shall be done one year prior to the first NMS installation or when CDR is accomplished, whichever occurs first. In addition, Spectrum Policy Management (ASR-100) shall be coordinated with if data transmission requires radio frequencies. Prior to this submission, the NMS implementation PT shall coordinate with the NIMS PT and the appropriate regions to obtain this connectivity information. This information will be used by AOP-400 to support NIMS/NMS telecommunications requirements. Any changes or updates to these schedules shall be

coordinated with the NIMS PT, AOP-400 and with ASR-100 when radio frequencies are used. This information is required far in advance of the project installation to ensure proper implementation, capacity planning, and communication resource allocation. The NMS implementation PT proxy agents/gateways and the appropriate NIMS Operations Center.will ensure that the physical communications connection is provided between each NMS and any ancillary proxy agents/gateways and the appropriate NIMS Operations Center.

(13) Include the NIMS/NMS activities in the project milestone schedule in the Master Scheduling System (MSS).

(14) Include the NIMS/NMS interface hardware in the facility specific delivery schedule in the Material Delivery Forecasting Module (MDFM). Location names should be placed in the MDFM at contract award or earlier.

(15) Include the NIMS/NMS in the project status reports presented at the implementation IPT Acquisition Reviews (AR). Specific milestones selected shall be adequate to assess NIMS/NMS project progress.

(16) Include the NIMS/NMS and any ancillary proxy/gateway hardware/software in the integrated logistics support section of the project IPP or, if applicable, in the Integrated Logistics Support Plan (ILSP) in accordance with Order 1800.58A, National Airspace Integrated Support Policy. Include the NIMS PT participation in the F&E project NAILS Management Team (NAILSMT).

(17) Submit all required F&E project NIMS/NMS-related NCPs to the NMS implementation PT's Configuration Control Board (CCB).

(18) Notify the NIMS PT when preliminary or formal In-Service Reviews (ISR) will occur.

(19) Provide financial resources to NIMS for NMS interface implementation. Each NMS implementation PT is responsible for establishing and maintaining F&E project cost baselines. The specifics of the funding arrangements shall be detailed in the NMS implementation PT-to-NIMS PT LOA for each individual project. The NIMS/NMS-related activities funded by the NMS implementation PT generally include:

(a) NMS retrofit development.

(b) Development of NMS-to-NIMS interface software, including NMS specific proxy agent and NIMS Manager requirements, and software documentation required for AOS second-level support of interface software.

(c) Procurement and installation of NMS-to-NIMS Proxy Agent hardware at all designated field sites.

(d) Initial F&E Telecommunications requirements.

(e) Development of a test bed for testing of the NIMS/NMS.

(f) Test planning and procedures development for the NIMS/NMS developmental testing and System Test.

(g) NIMS/NMS developmental testing and System Test.

(h) NIMS/NMS Interface NAS Operational Test (OT) and NAS OT of the NMS.

(i) AOS-200 NMS/NIMS field familiarization testing.

(j) NIMS/NMS training documentation and other NIMS/NMS NAILS efforts.

b. NIMS PT Responsibilities. The NIMS PT shall ensure overall compliance with the NAS technical baseline and ascertain the suitability of each NMS for interconnectivity into the NIMS. To accomplish this the NIMS PT shall:

(1) Negotiate a Letter of Agreement (LOA) with the NIMS PT. Appendix 1, Sample LOA, contains the recommended form and content of the document. This LOA shall indicate the NIMS/NMS-related activities to be accomplished, the organization responsible for performing or coordinating each activity, the anticipated schedule for completion, and the estimated NIMS/NMS-related F&E project funding requirements, including the sources of the funding. The LOA shall be completed as early as possible in the F&E project life cycle, preferably prior to the development of the equipment specification and SOW. This LOA shall be coordinated with the NIMS PT to determine the appropriate content. The LOA shall serve as a mutual agreement for the NMS implementation PT and NIMS PT responsibilities. All affected organizations must concur with the LOA.

(2) Review and comment on the F&E project specification and SOW for compliance with the NAS technical baseline.

(3) Direct NIMS software development and System Test.

(4) Direct the integration of the NMS testing into the NIMS testing. (The NMS implementation PT will provide an opportunity for testing within the contract.)

(5) Direct the performance of NIMS developmental testing a minimum of 6 months prior to the implementation F&E projects first ORD. The NIMS PT shall provide a NIMS/NMS Developmental Test Report to the NMS implementation PT 30 days after completion of the test.

(6) Participate in project technical reviews and ISRs as appropriate.

(7) Provide technical assistance to the NMS implementation PT on application and interpretation of NIMS governing documentation.

(8) Review and provide comments on the F&E project contractor's NIMS/NMS test plans and procedures.

(9) Support coordination with the NMS implementation PT and AOP-400 to determine the requirements for connectivity between the NMS and the NIMS processors.

(10) For interfaces which employ proxy agents, develop the NIMS Manager-to-Proxy Agent ICD, initiate NCP for the ICD, and obtain FAA CCB approval of the ICD.

(11) As necessary, initiate ICD and obtain FAA CCB approval to deploy NIMS proxy agents to all FAA-designated field locations.

8. NMS IMPLEMENTATION DOCUMENTS. The NMS implementation PTs are responsible for compliance with the latest version of the following documents:

a. *NAS-SR-1000, National Airspace System, System Requirements Specification, Section 3.7.1.* Describes the requirements for maintenance and remote monitoring of NAS subsystems.

b. *FAA-HDBK-046, Open Systems Management Handbook.* Describes the standards and protocols to be used with management systems that follow either the ISO Open System Interconnection (OSI) reference model or the Internet Protocol Suite.

c. *FAA-E-2911, Functional Specification for NAS Infrastructure Management System (NIMS) Managed Subsystems.* Describes the functional requirements of the managed subsystems under the NIMS architecture.

d. *FAA-E-2912. NAS System Level Specification for NAS Infrastructure Management System (NIMS).* Documents the functional, performance, design, construction, and support requirements for the NIMS. This is the baseline document that applies to the NIMS architecture.

e. *NAS-IR-51070000, NAS Infrastructure Management System Manager-to-Managed Subsystem Interface Requirements Document.* Describes the interface between the NIMS manager and the managed subsystem. The Interface Requirements Document (IRD) serves as the basis for a family of Interface Control Documents (ICD). Each ICD defines how the functional requirements of the IRD are realized using a NIMS-approved open standard management protocol. Each NMS with open system management protocols not covered by this document will be negotiated on an ad hoc basis. Development of the Object Linking and Embedding (OLE) for Process Control (OPC), Common Management Information Protocol (CMIP), and Simple Network Management Protocol version3 (SNMPv3) ICDs are being included for information purposes only.

f. *NAS-IC-51070000-1, Revision A. NAS Infrastructure Management System Manager/Managed Subsystem Using the Simple Network Management Protocol Version 1 (SNMPv1).* The industry standard that will be applied under a new NIMS interface standard. The use of SNMP as the network management protocol is currently recommended due to the growing acceptance of this protocol by industry.

g. *Order 6000.30B, Policy for Maintenance of the National Airspace System (NAS) Through the Year 2000.* Order 6000.30B establishes a requirement for a NIMS capability in all future NAS subsystems. This provision is being updated for developing projects. Other sections of this document specify the general requirements for Remote Maintenance Monitoring (RMM)/NIMS, and remain in effect. All new systems are required to incorporate modular design techniques to support three levels of maintenance, field maintenance , engineering support, and depot support. On site repair will be limited to the removal and replacement of the lowest replaceable unit (LRU) to restore service. Depot level maintenance will consist of repairing and/or replacing the faulty LRU.

h. *Acquisition Management System Test & Evaluation Process Guidelines, June, 1999.* Provides Test and Evaluation (T&E) guidance in support of the Acquisition Management System (AMS).

9. OTHER GOVERNING DOCUMENTATION. Each of the following documents apply to NIMS in varying degrees. The most current versions should be used in NMS/NIMS development and management.

a. Capital Investment Plan (for) Facilities, Equipment and Associated Development.

b. Order 1800.58A, National Airspace Integrated Logistics Support (NAILS) Policy.

c. Order 1800.8F, NAS Configuration Management.

d. Order 2500.8A, Funding Criteria for Operations, Facilities and Equipment (F&E), and Research, Engineering and Development (R, E&D) Accounts.

e. AMS Test and Evaluation Process Guidelines.

f. FAA-STD-025, Preparation of Interface Documentation.

g. FAA-STD-028, Contract Training Programs.

h. FAA-STD-036, Preparation of Project Implementation Plans.

i. FAA Standard FAA-STD-005, Preparation of Specification Documents.

j. MIL-STD-973, Configuration Management Data Interface.

10. ACRONYMS.

AR	Acquisition Review
ARTCC	Air Route Traffic Control Center
CCB	Configuration Control Board
CDR	Critical Design Review
CMIP	Common Management Interface Protocol
F&E	Facilities & Equipment
ICD	Interface Control Document
ILSP	Integrated Logistics Support Plan
IPP	Integrated Program Plan
IRD	Interface Requirements Document
ISR	In-Service Review
LOA	Letter of Agreement
MDFM	Material Delivery Forecasting Module
MDT	Maintenance Data Terminal (portable and fixed)
MSS	Master Scheduling System
NAILS	National Airspace Integrated Logistics Support
NAILSMT	NAILS Management Team
NCP	NAS Change Proposal
NIMS	NAS Infrastructure Management System
NMS	NAS Managed Subsystem
ORD	Operational Readiness Demonstration
OLE/OPC	Object Linking and Embedding for Process Control
OT	Operational Test
PDR	Preliminary Design Review
PIP	Project Implementation Plan
PT	Product Team
RMS	Remote Monitored Subsystem
SNMP	Simple Network Management Protocol
SOW	Statement of Work
T&E	Test and Evaluation
TIM	Technical Interchange Meeting
VRTM	Verification Requirements Traceability Matrix

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APPENDIX 1, SAMPLE LETTER OF AGREEMENT

Between The NAS Managed Subsystem Product Team (AXX-XXX) And The NAS Infrastructure Management System (NIMS) Product Team, AOP-10

_____

Product Team Lead for (NMS Product), AXX-XXX

Date:_____

_____

Product Team Lead for NIMS, AOP-10

Date:_____

1.0 SCOPE.

1.1 Purpose. The modernization of the National Airspace System (NAS) has generated new interdependencies between Facilities & Equipment (F&E) product teams. The NMS implementation PT's responsibilities for these interdependencies require a means to effectively negotiate agreements between themselves and the NIMS PT. This Letter of Agreement (LOA) will provide a management tool that perpetuates a mutual understanding of the requirements and responsibilities of the NMS implementation PT implementing the NAS Managed Subsystems (NMS) portion of the facility or equipment and the responsibilities of the NAS Infrastructure Management System (NIMS) PT.

1.2 Objective. This LOA between the NMS product team and the NIMS PT will specify the roles and responsibilities that will ensure the successful integration of the NMS into the NIMS. This LOA shall define the work to be performed, the resources to be applied, the responsibility for funding, and the milestone and critical action scheduling requirements. All organizations mentioned in this LOA shall concur with their specific content prior to the acceptance of this document. Order 6090.1B, Development and Implementation of NAS Managed Subsystems, shall be used as a guide in developing the content of this agreement.

1.3 Background. Order 6090.1B specifies the requirement and general content for this LOA.

1.4 Modification of LOA. This LOA can only be modified by mutual agreement of the NMS product team and the NIMS PT. Any revisions or modifications to this agreement will be valid upon signature of the appropriate NMS implementation PT management and the designated NIMS PT representative.

1.5 Precedence of LOA. In the event of conflicts between agreements established in this LOA and previous agreements, the agreements cited in this LOA shall take precedence.

2.0 RESPONSIBILITIES. The following subparagraphs describe the responsibilities of the NMS product team and the NIMS PT.

2.1 XXX Product Team, AXX-XXX, Responsibilities.

2.1.1 XXX NMS General Description. This paragraph should describe the NMS in general, including its basic capabilities and how it integrates into the facility or equipment. A general description of the facility or equipment should be described. It should also identify the external interfaces of the NMS.

2.1.2 NMS Requirements. This paragraph should discuss NMS implementation PT's responsibilities with regard to ensuring that the NMS requirements, as defined in the NAS technical baseline and other documentation (refer to paragraph 3.0, Governing Documentation), are included as part of the F&E project design effort.

2.1.3 Statement of Work (SOW). This paragraph should describe the NMS content to be included in the F&E project SOW. Indicate how changes will be coordinated with the NIMS PT.

2.1.4 NMS Design Reviews and Technical Interchange Meetings (TIM). This paragraph should discuss and include the following information regarding the various design reviews:

> The NMS product team will inform and invite the NIMS PT to attend and participate in all appropriate NMS design reviews.

2.1.5 Interface Control Document (ICD). This paragraph should describe the purpose and general content of the applicable ICD.

2.1.5.1 ICD Development. This paragraph should describe the ICD development process including projected draft/final dates and presentation requirements. This section should include the following, as appropriate:

The NMS product team will ensure that the F&E project contractor's ICD incorporates the NMS requirements specified in section 2.1.2.

The NMS product team will ensure the contractor ICD is developed in accordance with the latest edition of FAA-STD-025. The CCB-approved and baselined ICD, under configuration control, shall be available at least one year prior to the first Operational Readiness Demonstration (ORD). It is the NMS Product Team responsibility to baseline the ICD via the NAS Change Proposal (NCP) process. Critical Design Review (CDR) shall not be considered complete until a baselined ICD is available.

2.1.5.2 ICD Review. This paragraph should describe the agreements pertaining to review and resolution of comments. This paragraph should also include the following:

For each iteration of the ICD the NMS product team will ensure that the NIMS PT is provided an opportunity to review (30-day review cycle) and provide comment to any ICD relating to NIMS. All changes to the ICD affecting the NIMS shall be coordinated with the NIMS PT prior to approval by the CCB. The NMS product team will ensure that all NMS-related comments are resolved before the documents are baselined. Any subsequent changes shall be implemented via the NCP process.

2.1.6 NMS Testing. This paragraph should describe the NMS implementation PTs responsibilities with regard to the NMS testing. It should describe coordination between the NMS implementation PT's, types of testing, and periods of availability of the NMS for testing sponsored by other product teams.

2.1.6.1 Developmental Testing. This paragraph should include the following:

The NMS Product team will ensure availability of the NMS for a period of one month for the purpose NIMS developmental testing, under the direction of the NIMS Test and Evaluation Team. This testing shall commence a minimum of 6 months prior to first ORD. Additionally, upon delivery of the baselined ICD, a minimum of 6 months prior to the expected date of developmental testing commencement, the NMS product team will inform the NIMS PT and AOP-400 of the location and schedule of the NMS' availability for developmental testing.

2.1.6.2 System Test. This section describes the NMS implementation PT's roles and responsibilities in testing the performance and integration of the NMS into the NIMS.

2.1.6.3 Other Testing.

2.1.7 Plans and Procedures. This paragraph should identify all plans, procedures, and other documentation produced by the NMS implementation PT that relates to the NMS. Delivery schedule information for these documents should be included in the section titled Schedule Requirements.

2.1.7.1 Acquisition Strategy Paper (ASP)/Integrated Program Plan) (IPP). Test planning and NAILS planning are contained in the ASP and IPP. This paragraph should address the generation, review, and resolution of comments of the ASP and IPP as they relate to the NIMS/NMS.

2.1.7.2 Project Implementation Plan (PIP). This paragraph should address the generation, review, and resolution of comments of the PIP as it relates to the NIMS/NMS.

2.1.7.3 Other.

2.1.8 Data Communications. The paragraph should describe the NMS implementation PT's roles and responsibilities with regard to data communications. It should identify the organizations responsible for the coordination and implementation of the NMS-to-NIMS data communications requirements. The Data Communications paragraph should, at a minimum, include the following:

> One year before the first NMS installation or when CDR is accomplished, whichever occurs first, the NMS product team will submit project implementation schedules and NMS to NIMS connectivity information for all planned installations to the NIMS PT and AOP-400. Prior to this submission, the NMS product team will coordinate with the NIMS PT and the appropriate regions to obtain connectivity information. This information will be used by AOP-400 to provide the proper service to support the NMS telecommunications requirements. The project implementation schedules and updates to these schedules should be provided to the NIMS PT and AOP-400 as soon as they become available to ensure proper communications resource allocation. The NMS product team will ensure the physical communications connection is provided between each NMS and the NIMS processors.

2.1.9 Schedule Requirements. This paragraph should list the milestones and critical actions to be conducted by the NMS implementation PT. Each milestone should include the projected date of occurrence. The following milestones should be included as a minimum:

Milestones	**Date**
Submit Draft Specification	
Specification Baselined	
SOW submittal	
PIP submittal	
Contract Award	
SRR	
SDR	
PDR	
Draft NMS/NIMS ICD Submittal to the NIMS PT	
Coordinate NMS to NIMS communications for all installations	
CDR	
Baselined ICD Submittal to the NIMS PT	
Support Pre-developmental Testing	
Provide Developmental Test Site information to the NIMS PT	
NMS Available for Developmental Test	
Support NIMS Operational Tests	
Support Field Familiarization testing	
First ORD	
Last ORD	

2.1.10 Funding. This paragraph should discuss any funding responsibilities of the NMS implementation PT for all NIMS-related activities.

2.2 The NIMS PT Responsibilities. The NIMS PT office is responsible for filling in sections 2.2.1 through 2.2.11.2.

2.2.1 General Description. This paragraph should describe the overall the NIMS PT architecture that will be implemented to accommodate the NMS.
The General Description paragraph should, at a minimum, include the following:

> The NAS NIMS consists of a network of hardware and software that is capable of monitoring the operational status of the NAS equipment and facilities. To accomplish this, NIMS interfaces with the following basic subsystems:
>
> > a. NMS - NAS Managed Subsystems; an integral part of a facility or equipment that monitors and reports status, provides the capability to execute remote control commands, and serves as a local maintenance access point. The NMS encompasses subsystem manager to NIMS manager interfaces, embedded manager to NIMS manager interfaces, proxy/gateway manager to NIMS manager interfaces, and Remote Monitored Subsystem (RMS) interfaces.
> >
> > b. MDT - Maintenance Data Terminal; an external device that can interface to and access the NIMS via an NMS or NIMS processor. When interfaced to the NMS, the MDT is used to access and perform maintenance functions of the NMS, including on-site control of the facility for maintenance purposes. The on-site MDT is also used to communicate with the NMS functioning as a communications transfer device.

2.2.2 NIMS Requirements. This paragraph should discuss the NIMS PT's responsibilities with regard to ensuring that the NIMS requirements, as defined in the NAS technical baseline and other documentation (refer to paragraph 3.0, Governing Documentation), are included as part of the F&E project developmental effort.

2.2.3 Statement of Work (SOW). This paragraph should describe how the NIMS PT will review all NIMS-related sections of the F&E project SOW and provide comment to the NMS implementation PT with a 30-day review cycle.

2.2.4 NMS Design Reviews and Technical Interchange Meetings (TIM). This paragraph should discuss the various design and technical reviews; SRR, SDR, PDR, CDR, TIMs, etc.

2.2.5 Interface Control Document (ICD).

2.2.5.1 ICD Review. This paragraph should discuss the NIMS PT roles and responsibilities in the development, review, and/or resolution of any NMS-related ICD issues. The following should be included:

> The NIMS PT will review all ICDs provided by the NMS product team and provide comments within 30 days of receipt. The NIMS PT will participate with the NMS product team in the resolution of all NMS ICD issues. All issues will be resolved prior to baselining the ICD.

2.2.6 Testing. This paragraph should describe the NIMS PT's roles and responsibilities for testing applicable to the NMS. Items to be addressed in this paragraph may include coordination, conduct, type

of testing, and schedule coordination with the NMS implementation PT for NIMS PT sponsored testing.

2.2.6.1 Developmental Testing. This paragraph should describe how the NIMS PT will perform developmental testing of the NIMS software with an NMS upon completion of the NIMS software adaptation. The NIMS PT will help coordinate with the NMS implementation PT and other appropriate organizations to determine availability of the NMS, communications, and access to the NIMS test facility. The purpose of developmental testing is to verify that the NIMS software adaptation corresponds to the managed subsystem ICD. During this test, the monitor and control capabilities of the NIMS/NMS will be exercised. This test also provides field personnel an opportunity to provide comment and suggestion on the screen presentation of the monitored data. The NMS implementation PT will be notified if the NIMS Test and Evaluation Team discovers discrepancies between the ICD and the actual NMS implementation, including computer/human interface issues.

2.2.6.2 NIMS Systems Tests. This paragraph describes the NMS implementation PT's and the NIMS PT's roles and responsibilities in testing the performance and integration of the subject NMS into the NIMS.

2.2.7 Plans and Procedures. This paragraph should describe the NIMS PT's role and responsibilities in generation, review, and comment resolution for all NMS-related plans, procedures, and other documentation produced by the F&E project contractor, the NMS implementation PT, and/or the NIMS PT.

2.2.7.1 Test & Evaluation. This paragraph should describe the NIMS PT's role and responsibilities in the generation, review, and comment resolution of the test and evaluation section of the IPP.

2.2.7.2 Project Implementation. This paragraph should define the NIMS PT's role and responsibilities in the review and comment resolution of the project implementation section of the IPP as it relates to NIMS.

2.2.7.3 Other Plans/Procedures.

2.2.8 Data Communications.

2.2.9 Schedule Requirements. This paragraph should detail the milestones and critical actions to be conducted by the NIMS PT. Each milestone should include the projected date of occurrence. The following milestones should be included as a minimum:

Milestones	**Date**
Review Draft Specification	
Review Draft SOW	
Review Draft PIP	
Receive Baselined Specification	
Participate in SRR	
Participate in SDR	
Review Draft NMS/NIMS ICD	
Participate in PDR	
Participate in CDR	
Receive Baselined NMS/NIMS ICD	
Adapt NIMS/NMS software	
Support NMS Pre-developmental Testing	

Direct Developmental Testing
Support NMS OT
Support NMS Field Familiarization Testing

2.2.10 NIMS Interface Development.

2.2.10.1 NIMS Software Adaptation. This paragraph should describe how the NIMS PT will direct the development of the NIMS software adaptation per the baselined ICD delivered to the NIMS PT a minimum of 12 months prior to first ORD of the NMS project.

3.0 GOVERNING DOCUMENTATION.

3.1 Applicable Documents. The most current edition of the following documents shall be used in the design and implementation of the NIMS interfaces unless otherwise stated.

3.1.1 NAS Documents.

a. Capital Investment Plan (for) Facilities, Equipment and Associated Development.

b. Order 1800.58A, National Airspace Integrated Logistics Support Policy.

c. Order 1800.66, Configuration Management Policy.

d. NAS-IR-5107000, NIMS System Manager to Managed Subsystem Interface Requirements Document.

e. NAS-IC-51070000-1, Revision A, Interface Control Document for NIMS Manager/Managed System using the Simple Network Management Protocol (SNMPv1).

f. FAA-E-2911, Functional Specification for NAS Infrastructure Management System (NIMS) Managed Subsystems. Describes the functional requirements of the managed subsystems under the NIMS architecture.

g. FAA-E-2912, NAS System Level Specification for NAS Infrastructure Management System (NIMS). Documents the functional, performance, design, construction, and support requirements for the NIMS.

3.1.2 FAA Standards.

a. FAA-STD-025, Preparation of Interface Documentation.

b. FAA-STD-028, Contract Training Programs.

c. FAA-STD-036, Preparation of Project Implementation Plans.

d. FAA-STD-005, Preparation of Specification Documents.

3.1.3 FAA Orders.

a. 1100.157A, National Engineering Field Support Division Maintenance Program Procedures.

b. 1800.8F, NAS Configuration Management.

c. 2500.8A, Funding Criteria for Operations, Facilities and Equipment (F&E), and Research, Engineering and Development (R, E&D) Accounts.

d. 6000.30B, Policy for Maintenance of the National Airspace System (NAS) Through the Year 2000.

e. 6030.45A, Facility Reference Data File.

f. 6090.1B, National Airspace Systems Managed Subsystems Development and Implementation.

3.1.4 Military Standards

MIL-STD-1521, Technical Reviews and Audits for Systems, Equipments, and Computer Software; 4 Jun 85 and Notice 1, 19 Dec 85.

4.0 Acronyms

AR	Acquisition Review
ARTCC	Air Route Traffic Control Center
CCB	Configuration Control Board
CDR	Critical Design Review
CMIP	Common Management Interface Protocol
F&E	Facilities & Equipment
ICD	Interface Control Document
ILSP	Integrated Logistics Support Plan
IPP	Integrated Program Plan
IRD	Interface Requirements Document
ISR	In-Service Review
LOA	Letter of Agreement
MDFM	Material Delivery Forecasting Module
MDT	Maintenance Data Terminal (portable and fixed)
MSS	Master Scheduling System
NAILS	National Airspace Integrated Logistics Support
NAILSMT	NAILS Management Team.
NAS	National Airspace System
NCP	NAS Change Proposal
NIMS	NAS Infrastructure Management System
NMS	NAS Managed Subsystem
ORD	Operational Readiness Demonstration
OLE	Object Linking and Embedding
OT	Operational Test
PDR	Preliminary Design Review
PIP	Project Implementation Plan
PT	Product Team
RMS	Remote Monitored Subsystem
SNMP	Simple Network Management Protocol
SOW	Statement of Work
T&E	Test and Evaluation
TIM	Technical Interchange Meeting
VRTM	Verification Requirements Traceability Matrix